Credit Rating Agencies and Conflict of Interest

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While formal anecdotal evidence of credit rating agencies flouting conflict of interest guidelines have been published by the SEC and the Senate, statistical evidence of this has yet to be found. Taking advantage of the bond rating refinement undertaken by Moody's on April 26 1982, as well as the fact that rating fees are positively related to the number or size of new bond issues, we examine the relationship between the bond rating refinements and the number and size of new bond issues within the five years before and after the refinement. We find evidence that bond "upgrades" are positively correlated with the number and size of new bond issues before the refinement, and that bond "downgrades" are similarly negatively correlated, which may be indicative of a manifested conflict of interest at Moody's during the bond rating refinement of April 26 1982.

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For my family.

CHAPTER 1

INTRODUCTION

CHAPTER 1: INTRODUCTION

Credit rating agencies, such as Moody's, have long occupied a quasi-regulatory position in the financial landscape, due to two main reasons: firstly, the reliance of the market on them for the providence of credit rating reports and analysis, especially for fixed income instruments; and secondly, federal regulations on the usage of such ratings for certain types of financial managers as banks and savings and loans may only invest in investment grade bonds (Cantor and Packer, 1995).

However, credit rating agencies are placed in a conflicted position: while investors and users of their ratings expect them to accurately certify the riskiness of certain securities, their shareholders also expect the credit rating agencies to maximize profit. Since the main stream of revenue for these agencies come from the rating of fixed income instruments, profit maximization is likely to entail the widespread certification of various securities as safe. In other words, there may be an inherent conflict of interest at play in the rating process due to the incentives involved.

Similarly, when the bond rating requirement was imposed for Federal deposit insurance, the requirement was attacked by Palyi (1938), as the methods were biased in favour of the better ratings. However, the federal response was limited, and did not address Palyi's argument of inaccuracy and non-transparency sufficiently (Levy and Peart, 2010). This lack of response and any follow up by the authorities allowed the methods to stay in place, contributing to a certain extent the evolution of these methods to be even more biased in favour of the higher ratings given by any of the three agencies.

1.1 MOTIVATION

In July 2008, the Securities and Exchange Commission issued a report which concluded that the major rating agencies had "flouted conflict of interest guidelines and considered their own profits when rating securities." Later on in April 2010, the Senate Permanent Subcommittee on Investigations released evidence that from as early as 2004, Standard & Poor's employees were under pressure to increase business, and that business would be lost if the agency did not treat the collateralized debt obligations market favorably. The Subcommittee also concluded that Standard & Poor's and Moody's had allowed competitive pressures to affect their ratings.

1.2 OBJECTIVES AND OVERVIEW

However, while there has been formal anecdotal evidence of a manifested conflict of interest, there is little statistical evidence to date regarding the hypothesis that the credit rating agencies have improperly discharged their duties and exploited this conflict of interest.

In this paper, we examine the possibility that a credit rating agency, namely Moody's, may take advantage of its position. We approach this question by focusing on bond rating changes which are not accompanied by changes in the risk level of the issuers, by using the rating system refinement undertaken by Moody's April 26 1982.

According to the bond record published by Moody's, this rating refinement of some of the original coarse rating categories by adding a numerical modifier was based on the same information used to generate the original coarse rating. In other words, the rating changes were not caused any changes in the risk position of the issuers. Furthermore, this refinement was applied to all the bonds on the same day, and was not preceded by any announcement (Kliger and Sarig, 2000).

Therefore, any rating changes on April 26 1982 are solely at the discretion of Moody's. Hence, we hypothesize that the rating refinement serves as a carrot or stick opportunity for Moody's to reward or punish clients firms. We also hypothesize that bond rating changes may also include information on the existence of a manifested conflict of interest, and propose variables related to the number and value of bonds issued one to five years before and after the refinement as proxies for this purpose, since these variables are positively related to rating fees.

1.3 CONTRIBUTIONS

We show the relationship between the proxies and the bond rating refinement in two ways. Firstly, we find that the likelihood of obtaining an upgrade in the rating refinement is positively related to the both the number of bonds issued and value of the bonds issued one year before the refinement, and the number of bonds issued in the five years before the refinement. In other words, prior issuance activity makes it more likely that any bonds already released by the firm are upgraded.

On the other hand, the likelihood of being not downgraded is negatively related to the total value of bonds issued five and two years before the refinement and the number of bonds issued one year before the refinement. This denotes that bonds released by firms with prior issues are less likely to be downgraded when re-rated.

Secondly, we find that a bond rating non-downgrade in the refinement exercise is correlated with an increase in the number of firm bond issues and issue size for the year after the refinement. This may be interpreted to mean that a non-downgrade may be motivated by the promise of a bond issue in the near future, since the new potential bond issue is also a potential revenue source for the credit rating agency.

Next, we control for the possibility that the pre and post refinement counting variables are both related to the rating changes at the same time, and find that the results continue to be robust with this specification.

We also examine how the nominal bond rating may be related to our independent variables, and find that bond issuance activity 1, 2, or 5 years after the refinement has a negative impact on the bond rating, while bond issuance activity 1, 2, or 5 years before has a positive impact on the bond rating. We interpret this to mean that the refinement exercise may have been used as a one off rewarding opportunity by Moody's, and that any post refinement activity did not have an impact on the rating refinement.

Finally, we conclude that there appears to be some evidence that Moody's may have taken advantage of its position as a credit rater, and that further investigation in this direction may be merited.

1.4 STUDY ORGANISATION

The rest of the paper is organized as follows: In Chapter 2, we discuss the credit rating agencies, and in Chapter 3, the literature regarding the informational content of bonds and the conflict of interest faced by credit rating agencies. Chapters 4 and 5 describe the methodology and data respectively, while the results are shown in Chapter 6. Chapter 7 concludes the paper.

CHAPTER 2

CREDIT RATING AGENCIES

CHAPTER 2: CREDIT RATING AGENCIES

As outlined in Ederington and Yawitz (1987), the main risk for investors who purchase fixed-income securities or bonds is the possibility that the issuing company may default on the debt obligation. However, the evaluation of this default risk is complicated, due to the large number of variations in the issue characteristics.

Due to the difficulty of evaluating default risk, specialist firms called credit rating agencies developed, of which the three largest credit rating agencies are Standard and Poor's (S&P), Moody's, and Fitch. However, this does not mean that the credit rating agencies can be taken as direct substitutes, as credit rating agencies have differing industry strengths and expertise levels. Similarly, this does not mean that a rating in one system will have an equivalent rating in another rating system, which also denotes that the ratings are not cross-rating agency comparable.

Generally, credit rating agencies provide information regarding the default risk as well as changes in default risk to existing and prospective investors, in the form of a credit rating for each specific bond issue. The credit ratings serve as a summary of the default risk of an issue, which the probability that an issuer will or will not meet its debt obligations. It is important to note that these summaries denote the relative and not the absolute probability of default.

However, not all bonds may be rated. While S&P and Moody's will automatically rate certain issues if they feel that their subscribers will be interested in those issues, other issues, however, will require an issuer rating fee. It must be noted that the main business of S&P and Moody's is in rating large, public, long term corporate bond issues, while other debt obligations are only rated upon request.

After the release of a rating, the issue is then continuously monitored by the rating agencies, and rating changes applied if necessary. The rating agencies will meet with issuers at least once a year, and will base their decision to red flag ratings for changes based mainly on financial ratio comparisons.

2.1 CREDIT RATING AGENCY REVENUE STREAMS

Previously, the main revenue stream for credit rating agencies was from selling their ratings to investors. However, since it is difficult to prevent sharing of sold ratings, especially with the proliferation of the photocopier, many credit rating agencies switched to a business model based on voluntary issuer fees instead. In general, issuer fees are capped at a maximum and minimum, with the difference dependent on the size of the issue.[1]

While the main focus is largely on large, public, corporate bond issues, in 1987, however, Moody's reported that less than 2% of domestic corporate issuers fail to pay the issuer fee. Ederington and Yawitz (1987) hypothesize that such voluntary payment is due to the fact that the fee is fairly small, and that the payment of this fee allows the issuers to talk directly to the credit rating agencies and present their "best case," which would increase the chances of obtaining a favourable rating, with related benefits in the market.

[1] In 1985, Moody's minimum fee was $4000, maximum $35000. The basic charge was 0.02% of the principal amount of the bond issue, or $20000 for a $100 million bond issue.

2.2 CREDIT RATING REFINEMENT

Previously, the rating systems were relatively crude in terms of the number of different levels available for rating. From the 1970s, rating agencies began to include a modifier to their ratings, with Fitch and S&P gradually introducing modifiers in 1973. As the modifiers were gradually phased in, it is difficult to conclude that the ratings were purely based on existing information at the time of any rerating.

Moody's, however, released a special edition of its monthly Bond Record on 26 April 1982 that simultaneously introduced and implemented the modifier for all of its currently rated bond issues. The modifier consisted of a number, which ranged from 1 to 3, where a modifier of 1 denoted the top level within a letter rating, while 3 denoted the bottom level.

Most importantly, Moody's emphasized that the new ratings were simply refinements of the old ratings, and were based on the same information and rating process in place before the change.

Notably, this change was also not preceded by any public announcement, and was not accompanied by a real change in the economic standings of the firms and issues. Hence, the event is a unique opportunity to test if the credit rating changes by Moody's are motivated by a possible conflict of interest, independent of all publicly available information.

CHAPTER 3

LITERATURE REVIEW

CHAPTER 3: LITERATURE REVIEW

3.1 INFORMATIONAL CONTENT OF BOND RATINGS

One of the key arguments in favor of credit rating agencies remains the idea that a relationship between the credit rating agencies and the bond issuer will result in non-public information to be made available to the credit rating agencies, and hence, by extension, public investors.

If these relationships result in additional information and hence more accurate ratings, it is to be expected that the market investor will have some reaction to the release of these ratings as the informational content of these ratings will include information that is not publicly available.

3.1.1 RATINGS AND BOND YIELDS

One approach, as exemplified by Ederington, Yawitz, and Roberts (1987), relate bond ratings to bond yields, controlling for firm and issue characteristics (and hence the publicly available information), and find that ratings are a significant explanatory factor of the bond yields.

However, since bond ratings are by design a proxy for various other variables such as the leverage position, debt, and financial health of the firm (amongst others), it is difficult to conclude that the ratings include information that is difficult to obtain. Furthermore, bond yields have generally been dependent on the bond rating, as investors are unlikely to purchase the more risky asset between two assets with similar interest payouts.

3.1.2 BOND OR STOCK PRICE REACTION

To sidestep this problem, an alternative approach is to examine bond or stock price reactions to bond rating changes, as this will control for all price change factors by using each firm as its own control.

While Wakeman (1978) found that there was little information conveyed in bond rating changes, later studies such as Goh and Ederington (1993), and Hand, Holthausen, and Leftwich (1992), find that bond and stock prices vary significantly after rating changes, especially for downgrades. Additionally, Goh and Ederington (1998) find that even analysts react to downgrades. In all, the evidence appears to fall on the side of the argument that bond rating changes are economically significant.

However, this approach suffers from another problem: a change in the financial fundamentals that cause a rating change should also be expected to cause changes in the bond or stock price. Hence, a rating may be nothing more than a summary of information that is available in the public domain, and be of little consequence to the well-informed investor.

3.2 RATING CHANGES DUE TO REFINEMENT

Another alternative is to examine rating changes which can be conclusively and exclusively linked to rating information. Such events are rare, however, and generally only occur when credit rating agencies refine their rating systems, which has happened in 1973 with Standard & Poor’s and Fitch, and Moody’s in 1982.

However, these refinements are not all usable in terms of a conclusive and exclusive link to rating information, as the refinement exercises undertaken by S&P and Fitch were done gradually, while Moody's refined their ratings on a single day on April 26, 1982. An extended easing in period would increase the likelihood of conflicting information or events which would reduce the likelihood that the data can be exclusively linked to the event itself.

3.2.1 PAST LITERATURE ON RATING REFINEMENTS

To date, three papers have focused specifically on the April 1982 Moody's rating system refinement, where Moody's implemented the use of modifiers 1, 2, and 3 on bond ratings from Aa to B.

The first, Kliger and Sarig (2000), concludes that while the rating change was not accompanied by a real change in the underlying situation in the economic situation of the firms involved or an announcement of a rating change, the market treated the change as if it contained new information.

Similarly, Liu, Seyyid, and Smith (1999) also conclude that the refinement contained additional information which led to a significant market reaction, and posit that their results lend support to the concept that rating agencies have an independent impact on bond prices.

Finally, Tang (2009) uses four measures of yield spreads as a proxy for the predictability of refinement changes, and also finds that rating refinements do contain additional information.

However, thus far, no papers, to the best of our knowledge, have attempted to look at the conflict of interest problem through this event.

3.3 CONFLICT OF INTEREST OF CREDIT RATING AGENCIES

3.3.1 MARKET ANTICIPATION

Existing literature on the conflict of interest of credit rating agencies has been just as limited. Covitz and Harrison (2003) hypothesize that the market anticipation of a downgrade will be larger if the conflict of interest is significant, and use a measure of the delay in the yield reaction to a bond rating change as a proxy for conflict of interest.

While they conclude that a bond rating change is 75% anticipated and that there is no conflict of interest detected, any observed differences in market anticipation across different bonds may not be solely due to differences in the level of conflict of interest. For example, any observed delay may be due to the cautiousness of the credit rating agencies in helping the companies avoid triggering rating triggers, since these triggers may lead to a vicious cycle of increased default risk and downgrades which may impact investors more adversely.

3.3.2 INFORMATION WEIGHTAGE

Alternatively, Butler and Rodgers (2003) attempt to determine the presence of a conflict of interest by classifying the information available to rating agencies as hard and soft, which are analogous to publicly available information and information obtainable only via an existing relationship respectively. They hypothesize that an existing relationship will increase the emphasis on soft information, denoting that a conflict of interest may be exemplified by an extraordinary emphasis on the soft information.

However, they find no evidence of a conflict of interest, but only evidence that the credit rating agencies use soft information more when there is an existing relationship between the company and the credit rating agencies.

Hence, at this point, evidence on the manifestation of conflict of interest at the credit rating agencies, with regards to corporate bonds, is mixed at best.

3.3.3 CDOS AND CONFLICT OF INTEREST

However, on the topic of collateralized debt obligations (CDO), Griffin and Tang (2010) find that actual CDO ratings are less accurate than those from a rating agency model. They find that this discrepancy is largely due to AAA rated CDOs being given larger adjustments, as AAA actual rated CDOs should have been rated BBB on average. These CDOs with large adjustments also perform below expectations subsequently, denoting a possible manifestation of conflict of interest.

While evidence involving CDOs may not be directly applicable to the corporate bond heavy dataset of bonds that existed on the Moody's refinement date, it does provide an idea of what the rating agencies may have done in a similar situation.

CHAPTER 4

METHODOLOGY

CHAPTER 4: METHODOLOGY

We examine the credit rating system refinement undertaken by Moody's on a single day in April 1982. The benefits of using this event are largely due to the fact that any such changes would be conclusively linked to the actions of Moody's, rather than any economic change in the status of the company.

We follow the existing literature by denoting coarse bond ratings to be equivalent to a modifier of 2. Correspondingly, a modifier of 1 denotes an upgrade, and 3, a downgrade. For example, a prior bond rating of AA is equivalent to an AA2 in the new system, while a new rating of AA1 is an upgrade, and an AA3, a downgrade.

4.1 HYPOTHESIS

In this paper, we hypothesize that Moody's may upgrade bonds of firms which exhibit increased bond issuance activity (carrot), or not downgrade bonds of such firms (stick), since the bond rating refinement may present an opportunity for the credit rating agencies to either punish firms with little bond issuance activity or reward recent bond issuers, or advertise as such.

This refinement may also have been accompanied by additional meetings with the issuer despite Moody's assurances to the contrary, which would provide such an issuer with a privilege that was not extended to every issuer.

4.1.1 DEPENDENT VARIABLES

Therefore, two dependent variables, UP and DOWN, are defined for use in the regression. The variable UP is defined as being equal to 1 if the bond rating has been upgraded, and 0 otherwise (downgraded or remained the same). This indicates bonds which have been upgraded, which would serve as giving a carrot to firms.

Conversely, the variable DOWN is defined slightly differently: DOWN is defined as equal to 0 if the bond has been downgraded, but 1 if the bond rating has been upgraded or has remained the same. In other words, the variable DOWN indicates if a bond has been hit with a downgrade (stick).

4.1.2 MODEL

Hence, a conflict of interest may manifest itself in the counting variables exhibiting a positive and significant correlation with the binary variables UP and DOWN. The probit regression model is therefore as follows:

$$
\begin{aligned}
(\mathrm{BINARY}_i) = {} & \beta_0 + \beta_1\mathrm{DETERMINANT1}_i + \beta_2\mathrm{DETERMINANT2}_i + \ldots \\
& + \beta_n\mathrm{DETERMINANTn} + \beta_{n+1}\mathrm{COUNT1}_i + \beta_{n+2}\mathrm{COUNT2}_i + \ldots \\
& + \beta_{n+m}\mathrm{COUNTm}_i
\end{aligned}
$$

The determinant (DETERMINANT) and conflict of interest (COUNT) variables will be defined in the following sections.

However, an alternative hypothesis may be that Moody's may use the rating refinement as to encourage increased bond issue activity or discourage decreased bond issue activity, post refinement.

In other words, the rating refinement serves as an advertisement for the carrot or stick rather than as the carrot or stick itself. The difference here is that the former model is concerned with rewarding and punishing the firms directly, while the latter model is concerned with encouraging and discouraging, which may or may not include rewards or punishment.

Hence, we repeat the probit regressions, but use counting variables for the same five, two, and one year periods after 1982. In this case, we hypothesize that Moody's posturing, if successful, will lead firms to exhibit increased bond issuance activity after the refinement.

A probit regression is then implemented for both the carrot and the stick against the financial fundamentals and the proxies for conflict of interest, controlling for size. This technique is used primarily because the dependent variable is a binary variable, and any ordinary least squares regression will report biased results.

4.2 BOND RATING DETERMINANTS

In order to control for bond rating determinants, we use the framework of financial analysis for corporate bonds outlined in Fabozzi (2005), but also eliminate any listed variables or indicators which cover similar ground to other listed variables to avoid multi-collinearity problems. For example, instead of using both long term debt to book value capitalization and long term debt to market value capitalization for information on company leverage levels, we select long term debt to book value capitalization in order to avoid specification concerns which may bias our results.

Hence, for the traditional ratio analysis, we use pretax interest coverage (PINTCOV = (OIBDP + XINT) / XINT), leverage ratios (Long term debt to book value capitalization – LTDCAP = DLTT / (DLTT + CEQ)), cash flow to debt ratio (CFD = (OIBDP + DEPC + DPC + TXFC) / DLTT), and the current ratio (CUR = ACT / LCT), in order to focus on the characteristics of the bond issuer which should have a direct impact on default risk.

4.3 CONFLICT OF INTEREST

However, these fundamentals may not capture all the information available in the bond rating, as exemplified by the argument that a close relationship between issuer and rater may lead to the sharing of private information, and the literature regarding bond rating prediction models.[2] Therefore, we hypothesize that any additional information from the bond rating refinement may shed some light on the existence of manifested conflict of interest.

While there is no readily available proxy for a manifested conflict of interest, it is a fact that credit rating agencies are dependent on bond rating fees for revenue. As noted previously, the size of the rating fee is correlated to the number of bonds and size of bonds issued by the firms. In other words, a firm with recent bond issues can be reasonably assumed to have provided Moody's with revenue in the form of the rating fee.

[2] See Chan and Jegadeesh (2004) and Ederington (1985) for a discussion on bond rating prediction models.

4.3.1 CONFLICT OF INTEREST VARIABLE CONSTRUCTION

Hence, we obtain the number of bonds issues and total value of bond issues associated with firms with bonds in our sample for the five, two, and one year period before 1982 to serve as proxies for the manifestation of the conflict of interest. These variables are categorized as the COUNT variables in the regression.[3]

[3] We thank Louis H. Ederington for his suggestion of this class of proxies.

CHAPTER 5

DATA

CHAPTER 5: DATA

5.1 DATA SOURCES

The data for this study comes from several sources. The Moody's database provides the rating information and list of companies, while the SDC Platinum database provides the information on issues and issue size for the 5 calendar years before and after 1982. Company fundamentals are obtained from the CRSP/COMPUSTAT database.

We begin with 2,673 bonds as obtained from the Moody's database from March to April 1982, in order to capture the rating changes after rating system refinement. We eliminate bonds rated AAA and Caa and below before and after the refinement, and bonds with refinements of more than one grade. After merging the data with SDC Platinum and CRSP/COMPUSTAT, a final database of 682 bonds is obtained.

Following the literature, a prior bond rating is considered to be the equivalent of a refinement of 2. In other words, if a bond which was previously rated at A had its rating refined to A3, the prior rating is considered to be the equivalent of an A2, and the refinement is hence considered to be a downgrade of one grade. Therefore, any statement of upgrade in this paper refers to a refinement to 1, and downgrade, a refinement to 3.

5.2 DATA OVERVIEW

Table I provides descriptive statistics on the distribution of the bonds and their rating refinement. The majority of the sample comprises of bonds which were rated at A before the rating refinement, with 407 bonds or 59.68% of the sample. This indicates that the sample is largely composed of bonds of investment grade.

Overall, 57.77% of the 407 bonds were downgraded, denoting that bonds were more likely than not to be downgraded. 323 bonds or 79.36% of these 407 bonds rated at A were downgraded by one grade, with this category accounting for the bulk of the downgrades. Similarly, bonds previously rated A are also the only category to have a majority of its bonds be downgraded, while bonds previously rated AA have a majority of upgraded bonds. All other bond rating categories exhibit relatively even refinements.

The distribution statistics of the counting variables are described in table II. Notably, average total bond issue size generally expands after the rating refinement, while total bond issue size activity is much higher in the period between 2 years and 5 years before the refinement. Also, at least 25% of firms in the sample have not issued a bond, preventing the any logarithmic treatment of the total bond issue values.

The differences between the mean and the median as well as that of the median and the 75th percentile of the counting variables that measure total number of bond issues are relatively large for the two time extremes (5 years before and after). Since the same pattern emerges for the bond value counting variables, bond issuance activity appears to have slowed down around the rating refinement.

TABLE I

DISTRIBUTION OF BOND SAMPLE ACROSS RATING REFINEMENTS

The table describes the distribution of a sample of 682 corporate bond issues rated Aa-B from the Moody's Bond Record of April 26 1982. The sample is restricted to bonds with sufficient cross matched data from the CRSP/COMPUSTAT data for the appropriate fiscal year and SDC Platinum new bond issues for the five years before the appropriate fiscal year, as well as bonds with refinements of not more than one grade. Prior refers to the original Moody's coarse bond rating before the implementation and addition of the modifier. "1", "2", and "3" refer to the fine rating modifiers within the coarse rating categories in the April 26 1982 Moody's Bond Record. 1 is the best fine rating, 2 is the intermediate fine rating, and 3 is the worst fine rating.

Coarse	Prior	1	2	3
Aa	60	28	17	15
	8.80%	46.67%	28.33%	25.00%
A	407	23	61	323
	59.68%	5.65%	14.99%	79.36%
Baa	85	17	56	12
	12.46%	20.00%	65.88%	14.12%
Ba	30	1	24	5
	4.40%	3.33%	80.00%	16.67%
B	100	35	26	24
	14.66%	35.00%	26.00%	24.00%
Total	682	104	184	394
	100%	15.25%	26.98%	57.77%

TABLE II

DISTRIBUTION OF COUNTING VARIABLES

The table describes the distribution of the counting variables in our sample of 682 corporate bond issues rated Aa-B from the Moody's Bond Record of April 26 1982. The sample is restricted to bonds with sufficient cross matched data from the CRSP/COMPUSTAT data for the appropriate fiscal year and SDC Platinum new bond issues for the five years before the appropriate fiscal year, as well as bonds with refinements of not more than one grade. The counting variables are named: PRE0X(PRIN or FREQ), where X indicates the number of years before the refinement, while PRIN or FREQ determines the total bond issue size or the total number of bonds issued in the X years before the refinement.

TOTAL NUMBER OF BONDS ISSUED

VARIABLE	MEAN	MAX	MIN	75TH	MEDIAN	25TH
PRE05FREQ	3.13	8	0	8	1	0
PRE02FREQ	0.85	3	0	1	1	0
PRE01FREQ	0.55	2	0	1	0	0
POST01FREQ	1.46	5	0	4	0	0
POST02FREQ	3.22	11	0	9	1	0
POST05FREQ	5.06	22	0	13	2	0

TOTAL VALUE OF BONDS ISSUED

VARIABLE	MEAN	MAX	MIN	75TH	MEDIAN	25TH
PRE05PRIN	447.85	1325	0	1325	100	0
PRE02PRIN	71.40	300	0	75	75	0
PRE01PRIN	41.16	250	0	75	0	0
POST01PRIN	111.02	750	0	275	0	0
POST02PRIN	261.17	1450	0	675	100	0
POST05PRIN	461.12	2938.96	0	1100	178	0

CHAPTER 6

RESULTS

CHAPTER 6: RESULTS

6.1 PRE-REFINEMENT RESULTS

As mentioned previously, the UP variable is regressed against the chosen financial fundamentals and the counting variables, controlling for size, in order to ascertain if the credit rating agencies treat companies with a history of past business better or more positively. The results are reported in Table III.

For the carrot situation, the number of bonds and total value of bonds issued one year before the rating refinement are positively and significantly correlated with the probability of a rating upgrade after refinement. While the number of bonds issued over the past five years is also positively and significantly correlated, the magnitude is smaller.

The results indicate that Moody’s was possibly biased towards firms who have issued bonds in the year before the refinement, and may be indicative of a (then) short term view of the business, as these potential new issues on the horizon were short term business and revenue opportunities for Moody’s.

For the stick situation where the credit rating agencies use the threat of a potential downgrade to punish firms which have not issued bonds, the DOWN variable is regressed against the same set of financial fundamentals and counting variables, controlling for size. The results are reported in Table IV.

TABLE III

REGRESSION RESULTS OF CARROT MODEL (PRE-REFINEMENT)

The table describes the probit regression results of the carrot model for the counting variables before the refinement. The reported coefficients are of the regression equation

$$UP_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where UP is a binary variable that is 1 when the bond has been upgraded after the rating refinement, and 0 otherwise. PINTCOV is the pretax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and COUNT is the counting variable. The counting variables are named: PRE0X(PRIN or FREQ), where X indicates the number of years before the refinement, while PRIN or FREQ determines the total bond issue size or the total number of bonds issued in the X years before the refinement. Wald chi-square values are in parentheses.

INTERCEPT	-3.631***	-4.355***	-4..178***	-4.386***	-4.583***	-3.478***
	(18.91)	(20.97)	(23.90)	(20.29)	(31.25)	(17.18)
PINTCOV	0.011	0.017	0.014	0.017	0.008	0.012
	(0.56)	(1.00)	(0.73)	(1.00)	(0.30)	(0.64)
LTDCAP	0.779	2.566***	2.128***	2.59***	1.301**	1.422**
	(1.28)	(18.40)	(11.74)	(17.62)	(4.77)	(5.72)
CFD	0.102**	0.146**	0.140**	0.147**	0.119**	0.103*
	(2.91)	(5.95)	(5.64)	(6.04)	(4.02)	(2.94)
CUR	0.326**	0.316**	0.341**	0.319**	0.400***	0.276**
	(6.06)	(5.54)	(6.48)	(5.67)	(8.46)	(4.40)
LAT	0.172**	0.208**	0.192**	0.211**	0.276***	0.156**
	(5.38)	(5.65)	(6.35)	(5.24)	(12.84)	(4.33)
PRE05FREQ	0.303***					
	(16.53)					
PRE05PRIN		0.000				
		(0.05)				
PRE02FREQ			0.141			
			(1.85)			
PRE02PRIN				0.000		
				(0.02)		
PRE01FREQ					0.615***	
					(16.63)	
PRE01PRIN						0.005***
						(14.41)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

TABLE IV

REGRESSION RESULTS OF STICK MODEL (PRE-REFINEMENT)

The table describes the probit regression results of the stick model for the counting variables before the refinement. The reported coefficients are of the regression equation

$$DOWN_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where DOWN is a binary variable that is 0 when the bond has been downgraded after the rating refinement, and 1 otherwise. PINTCOV is the pretax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and COUNT is the counting variable. The counting variables are named: PRE0X(PRIN or FREQ), where X indicates the number of years before the refinement, while PRIN or FREQ determines the total bond issue size or the total number of bonds issued in the X years before the refinement. Wald chi-square values are in parentheses.

INTERCEPT	-2.178***	-3.252***	-2.747***	-3.289***	-2.673***	-2.824***
	(9.54)	(17.20)	(14.75)	(17.65)	(14.01)	(14.18)
PINTCOV	0.032	0.049**	0.047**	0.048**	0.061**	0.048**
	(2.08)	(4.73)	(4.39)	(4.69)	(6.11)	(4.27)
LTDCAP	0.232	1.635***	1.44**	1.663***	1.895***	1.426**
	(0.15)	(8.73)	(6.39)	(8.88)	(10.40)	(6.12)
CFD	0.084	0.119*	0.108*	0.116*	0.118*	0.114*
	(1.81)	(3.49)	(2.98)	(3.43)	(3.48)	(3.18)
CUR	0.142	0.143	0.114	0.126	0.093	0.139
	(1.69)	(1.63)	(1.04)	(1.29)	(0.66)	(1.53)
LAT	0.218***	0.313***	0.256***	0.324***	0.218***	0.254***
	(13.47)	(20.22)	(17.73)	(19.83)	(13.38)	(17.56)
PRE05FREQ	0.168**					
	(6.32)					
PRE05PRIN		-0.001**				
		(4.12)				
PRE02FREQ			-0.099			
			(1.15)			
PRE02PRIN				-0.002**		
				(3.94)		
PRE01FREQ					-0.344**	
					(6.52)	
PRE01PRIN						-0.001
						(1.10)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

We find that only the number of bonds issued 5 years before the refinement has a positive and significant impact on non-downgrades, while the total value of bonds issued 5 and 2 years before the refinement, as well as the number of bonds issued one year before the refinement, have a significant and negative impact.

Most importantly, we note the extremely large change in the impact of the number of bonds issued one year before the refinement across the two models. For the model of upgrades, the parameter estimate is positive and significant, but has become negative and significant for the model of non-downgrades.

As the only difference between the two models is the number of no-changes, this might indicate that the probability of firms who have issued a bond in the year preceding the refinement obtaining no change in the bond rating is highly unlikely and is what drives the change from a positive to negative coefficient.

Also, we note that the there is a significant and positive relationship between an upgrade for both carrot and stick models and the size of the firm. While the size of the firm may be a possible proxy for bond issues and bond issue sizes, such a conclusion would be difficult, since size is a notable proxy for many other variables.

6.2 POST-REFINEMENT RESULTS

Next, we examine the same probit model, but for issuance activity after the event, by using similar counting variables for the post-event period windows. The results of these tests are reported in tables V and VI.

We find no evidence of using the bond rating refinement as a carrot to encourage future bond issues, as all of the counting variables are negatively and significantly correlated to the probability of an upgrade at the refinement, with the exception of the total value of bonds issued 1 year after the refinement.

However, for the other side of the coin for the stick model, we find that an upgrade or no change may be significantly correlated with an increase in issuance activity one year after the refinement, but also find that the correlation becomes negative from the second year after the refinement onwards.

We interpret these results to mean that a positive or no change in the rating may be used to stimulate or encourage issuance activity and hence, increase revenue. In other words, these refinements may have created or aided the perception of a favourable rating situation for any potential issuers.

Also, size is once again a significant and positive determinant of a non-downgrade.

TABLE V

REGRESSION RESULTS OF CARROT MODEL (POST-REFINEMENT)

The table describes the probit regression results of the carrot model for the counting variables after the refinement. The reported coefficients are of the regression equation

$$UP_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where UP is a binary variable that is 1 when the bond has been upgraded after the rating refinement, and 0 otherwise. PINTCOV is the post-tax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and COUNT is the counting variable. The counting variables are named: POST0X(PRIN or FREQ), where X indicates the number of years before the refinement, while PRIN or FREQ determines the total bond issue size or the total number of bonds issued in the X years before the refinement. Wald chi-square values are in parentheses.

INTERCEPT	-4.841***	-4.82***	-5.963***	-5.989***	-4.537***	-4.611***
	(29.38)	(28.39)	(40.35)	(40.98)	(25.54)	(27.49)
PINTCOV	0.017	0.017	0.012	0.013	0.016	0.018
	(1.03)	(1.07)	(0.60)	(0.73)	(1.04)	(1.31)
LTDCAP	2.977***	2.961***	4.022***	3.787***	2.927***	2.800***
	(28.83)	(27.34)	(42.02)	(41.63)	(29.32)	(28.19)
CFD	0.158***	0.158***	0.181**	0.168***	0.128**	0.128**
	(7.03)	(7.01)	(9.08)	(7.87)	(4.51)	(4.54)
CUR	0.340**	0.335**	0.434**	0.400***	0.278**	0.258*
	(6.35)	(6.15)	(9.98)	(8.64)	(4.16)	(3.64)
LAT	0.255***	0.253***	0.362***	0.388***	0.284***	0.295***
	(10.54)	(10.08)	(19.16)	(20.79)	(12.72)	(13.95)
POST01FREQ	-0.223*					
	(3.09)					
POST01PRIN		-0.002				
		(2.09)				
POST02FREQ			-0.660***			
			(20.07)			
POST02PRIN				-0.006***		
				(19.00)		
POST05FREQ					-0.415***	
					(22.22)	
POST05PRIN						-0.003***
						(16.67)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

TABLE VI

REGRESSION RESULTS OF STICK MODEL (POST-REFINEMENT)

The table describes the probit regression results of the stick model for the counting variables after the refinement. The reported coefficients are of the regression equation

$$DOWN_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where DOWN is a binary variable that is 0 when the bond has been downgraded after the rating refinement, and 1 otherwise. PINTCOV is the post-tax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and COUNT is the counting variable. The counting variables are named: POST0X(PRIN or FREQ), where X indicates the number of years before the refinement, while PRIN or FREQ determines the total bond issue size or the total number of bonds issued in the X years before the refinement. Wald chi-square values are in parentheses.

INTERCEPT	-2.002***	-1.926***	-2.463***	-3.110***	-2.572***	-2.706***
	(8.02)	(7.28)	(12.09)	(19.01)	(13.75)	(15.31)
PINTCOV	0.046**	0.042*	0.045**	0.031	0.040*	0.042*
	(4.37)	(3.63)	(4.05)	(2.00)	(3.41)	(3.76)
LTDCAP	0.584	0.506	1.009**	1.539***	1.190**	1.254*
	(1.35)	(0.97)	(4.08)	(9.27)	(6.05)	(6.66)
CFD	0.090	0.087	0.102	0.110*	0.093	0.085
	(2.14)	(1.98)	(2.67)	(3.02)	(2.25)	(1.96)
CUR	0.092	0.104	0.118	0.157	0.119	0.088
	(0.69)	(0.89)	(1.12)	(2.065)	(1.17)	(0.64)
LAT	0.180***	0.177***	0.226***	0.316***	0.265***	0.302***
	(8.89)	(8.41)	(13.61)	(22.92)	(19.68)	(24.47)
POST01FREQ	0.468***					
	(14.43)					
POST01PRIN		0.005***				
		(11.04)				
POST02FREQ			0.073			
			(0.69)			
POST02PRIN				-0.003***		
				(6.94)		
POST05FREQ					-0.128***	
					(7.50)	
POST05PRIN						-0.002***
						(17.61)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

6.3 ROBUSTNESS CHECK I: PRE AND POST REFINEMENT

Then, we consider the possibility that any rating changes may be due not solely to post or pre refinement activity, but both. Since all the pre-refinement variables are correlated and dependent on each other (and similarly so for the post), we select one pre-refinement variable and one post-refinement variable for each regression. For simplicity, we use both the same year pre-refinement and post-refinement variables in each regression.

The results for the revised post and pre refinement carrot model are collected in table VII, while the results for the revised post and pre refinement stick model are collected in table VIII. We find that the results for all the models continue to hold after the revision. Additionally, size continues to be a positive and significant determinant of an upgrade or non-downgrade.

TABLE VII

REGRESSION RESULTS OF CARROT MODEL (PRE- AND POST-REFINEMENT)

The table describes the probit regression results of the carrot model for the counting variables before and after the refinement. The reported coefficients are of the regression equation

$$UP_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where UP is a binary variable that is 1 when the bond has been upgraded after the rating refinement, and 0 otherwise. PINTCOV is the post-tax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and PRE and POST are the counting variables. The columns are arranged such that the column names correspond to the year(s) before and after the refinement, and the type of variable used (FREQ or PRIN).

	01FREQ	01PRIN	02FREQ	02PRIN	05FREQ	05PRIN
INTERCEPT	-4.959***	-3.81***	-5.835***	-6.329***	-3.702***	-5.222***
	(33.69)	(18.36)	(36.20)	(31.46)	(17.02)	(23.75)
PINTCOV	0.009	0.013	0.011	0.013	0.014	0.019
	(0.33)	(0.71)	(0.53)	(0.77)	(0.91)	(1.36)
LTDCAP	1.671***	1.751***	3.835***	4.027***	1.543**	3.229***
	(7.15)	(7.51)	(27.47)	(31.28)	(4.44)	(24.55)
CFD	0.128**	0.112*	0.178***	0.175***	0.090	0.141**
	(4.63)	(3.44)	(8.66)	(8.11)	(2.09)	(5.24)
CUR	0.414***	0.285**	0.436***	0.411***	0.243*	0.284**
	(9.10)	(4.65)	(10.14)	(8.77)	(3.34)	(4.10)
LAT	0.311***	0.186**	0.350***	0.425***	0.225***	0.361***
	(15.23)	(5.50)	(16.27)	(15.14)	(7.99)	(12.53)
PRE	0.614***	0.005***	0.050	-0.001	0.208***	-0.001
	(16.76)	(13.87)	(0.219)	(0.35)	(7.11)	(1.32)
POST	-0.255*	-0.002	-0.659***	-0.006***	-0.384***	-0.003***
	(3.06)	(1.79)	(19.34)	(19.43)	(17.23)	(18.08)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

TABLE VIII

REGRESSION RESULTS OF STICK MODEL (PRE- AND POST-REFINEMENT)

The table describes the probit regression results of the stick model for the counting variables before and after the refinement. The reported coefficients are of the regression equation

$$DOWN_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where DOWN is a binary variable that is 0 when the bond has been downgraded after the rating refinement, and 1 otherwise. PINTCOV is the post-tax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and PRE and POST are the counting variables. The columns are arranged such that the column names correspond to the year(s) before and after the refinement, and the type of variable used (FREQ or PRIN).

	01FREQ	01PRIN	02FREQ	02PRIN	05FREQ	05PRIN
INTERCEPT	-2.086***	-2.137***	-2.639***	-4.320***	-2.28***	-4.210***
	(8.31)	(7.81)	(12.88)	(25.49)	(10.46)	(26.26)
PINTCOV	0.064**	0.047**	0.049**	0.036*	0.033	0.058**
	(6.60)	(4.06)	(4.52)	(2.80)	(2.29)	(6.33)
LTDCAP	1.308*	0.766	1.312**	2.463***	0.547	2.383***
	(4.77)	(1.64)	(4.61)	(15.26)	(0.77)	(16.30)
CFD	0.103*	0.096	0.105*	0.129**	0.081	0.111*
	(2.73)	(2.29)	(2.86)	(4.16)	(1.71)	(3.20)
CUR	0.055	0.110	0.107	0.155	0.129	0.100
	(0.23)	(0.97)	(0.91)	(1.98)	(1.39)	(0.76)
LAT	0.159***	0.189***	0.244***	0.462***	0.242***	0.482***
	(6.83)	(9.12)	(14.27)	(27.70)	(16.05)	(36.41)
PRE	-0.328**	-0.001	-0.083	-0.003***	0.118*	-0.003***
	(5.84)	(0.80)	(0.76)	(7.21)	(2.75)	(13.73)
POST	0.462***	0.005***	0.051	-0.004***	-0.098**	-0.003***
	(13.23)	(10.59)	(0.31)	(10.13)	(3.91)	(27.02)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

6.4 ROBUSTNESS CHECK II: POST-REFINEMENT BOND RATING

Next, we implement a robustness check by examining the relationship between the nominal bond rating and the variables used in the regression by running an ordered multinomial probit regression.

The dependent variable used is the nominal bond rating, which is converted to a numerical scale: AAA is equivalent to 1, and every step down increases the number by 1. For example, since AA1 is a step below AAA, it is given a numerical value of 2. AA2 therefore has a numerical value of 3, and so on. Note that the values are ordered backwards, since a higher numerical value denotes a more poorly rated bond.

The results of the robustness check pre-refinement regression are reported in table IX. We find that all of the counting variables are significantly associated with a decrease in the numerical value of the bond rating. In other words, the bond rating is likely to be impacted positively if there has been any bond issuance activity in the preceding five years, two years, or one year. This denotes that prior issuances are likely to lead to upgrades.

For the post-refinement regression (table X), it appears that any post refinement bond issuance activity is significantly and negatively related to the bond rating. This result may be interpreted as Moody's being able to reasonably predict the need for future debt issues, and hence penalize the firm's bond ratings, thus providing an accurate estimate of the firm's default risk.

The robustness checks could be viewed as such: while Moody's may be accurately rating bonds based on a prediction of the future activity of the bond issuers, it appears that there is some evidence to suggest that the ratings may be edited positively on the basis of past activity of the bond issuers, which may be considered as a manifestation of the conflict of interest.

TABLE IX

REGRESSION RESULTS OF NOMINAL RATING MODEL (PRE REFINEMENT)

The table describes the ordered multinomial probit regression results of the nominal rating model for the counting variables before the refinement. The reported coefficients are of the regression equation

$$VALUE_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where VALUE is an ordinal variable that is scaled to the Moody's bond rating scale (AAA = 1, AA1 = 2, AA2 = 3, …). PINTCOV is the post-tax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and COUNT is the counting variable. The counting variables are named: PRE0X(PRIN or FREQ), where X indicates the number of years before the refinement, while PRIN or FREQ determines the total bond issue size or the total number of bonds issued in the X years before the refinement. Wald chi-square values are in parentheses.

PINTCOV	-0.028***	-0.032***	-0.025**	-0.033***	-0.018*	-0.026**
	(7.22)	(9.45)	(5.38)	(9.88)	(2.74)	(6.03)
LTDCAP	10.611***	8.593***	10.18***	8.369***	11.33***	10.46***
	(246.59)	(248.75)	(271.80)	(230.55)	(324.10)	(302.30)
CFD	0.262***	0.215***	0.234***	0.209***	0.268***	0.271***
	(29.20)	(20.87)	(24.51)	(19.85)	(31.25)	(31.89)
CUR	0.049	0.081	-0.037	0.060	-0.096	0.094
	(0.31)	(0.87)	(0.17)	(0.47)	(1.15)	(1.13)
LAT	-0.765***	-0.605***	-0.720***	-0.609***	-1.049***	-0.780***
	(195.88)	(111.34)	(175.75)	(103.56)	(274.83)	(201.21)
PRE05FREQ	-0.497***					
	(65.12)					
PRE05PRIN		-0.003***				
		(32.69)				
PRE02FREQ			-0.689***			
			(70.91)			
PRE02PRIN				-0.004***		
				(19.47)		
PRE01FREQ					-1.408***	
					(132.96)	
PRE01PRIN						-0.012***
						(93.38)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

TABLE X

REGRESSION RESULTS OF NOMINAL RATING MODEL (POST REFINEMENT)

The table describes the ordered multinomial probit regression results of the nominal rating model for the counting variables after the refinement. The reported coefficients are of the regression equation

$$VALUE_i = \beta_0 + \beta_1 PINTCOV_i + \beta_2 LTDCAP_i + \beta_3 CFD_i + \beta_4 CUR_i + \beta_5 LAT_i + \beta_6 COUNT_i$$

where VALUE is an ordinal variable that is scaled to the Moody's bond rating scale (AAA = 1, AA1 = 2, AA2 = 3, …). PINTCOV is the post-tax coverage ratio, LTDCAP is the long term debt to book value capitalization ratio, CFD is the cash flow to debt ratio, CUR is the current ratio, LAT is the natural logarithm of total assets, and COUNT is the counting variable. The counting variables are named: POST0X(PRIN or FREQ), where X indicates the number of years before the refinement, while PRIN or FREQ determines the total bond issue size or the total number of bonds issued in the X years before the refinement. Wald chi-square values are in parentheses.

PINTCOV	-0.035***	-0.037***	-0.026**	-0.028***	-0.036***	-0.037***
	(11.00)	(12.62)	(6.03)	(7.19)	(12.08)	(12.81)
LTDCAP	6.757***	6.621***	6.751***	6.52***	7.172***	7.179***
	(194.64)	(183.21)	(188.06)	(174.46)	(224.65)	(223.28)
CFD	0.170***	0.164***	0.178***	0.180***	0.191***	0.188***
	(13.35)	(12.53)	(14.45)	(14.72)	(16.86)	(16.26)
CUR	-0.001	0.022	-0.061	-0.018	0.074	0.082
	(0.00)	0.063	(0.48)	(0.04)	(0.74)	(0.91)
LAT	-0.849***	-0.842***	-0.960***	-1.051***	-0.766***	-0.764***
	(219.21)	(214.79)	(243.91)	(250.19)	(199.35)	(194.06)
POST01FREQ	0.582***					
	(45.91)					
POST01PRIN		0.007***				
		(34.46)				
POST02FREQ			0.718***			
			(83.24)			
POST02PRIN				0.009***		
				(79.94)		
POST05FREQ					0.134***	
					(12.08)	
POST05PRIN						0.001**
						(4.70)

***, **, and * indicate significance levels at below the 1%, 5% and 10% levels respectively. N = 424.

CHAPTER 7

CONCLUSIONS

CHAPTER 7: CONCLUSION

The potential conflict of interest issue has been a long recognized potential problem in the credit rating agency business since the switch from an investor paying to company-to-be-rated paying system.

The problem may also have been exacerbated by financial regulations that limit certain financial managers to buying only securities which are rated investment grade as this system therefore empowers the credit rating agencies to be the quasi regulator of risk.

Nevertheless, the credit rating agencies have generally downplayed the conflict of issue, despite their conflicted position of needing to maximize both revenue and reputation (in the form of accuracy).

However, formal evidence presented by the SEC and the Senate Permanent Subcommittee on Investigations, motivated by the role of inaccurate ratings in the 2008 financial meltdown, have reported that the conflict of interest is sizable and significant, but there has been no statistical evidence to date.

7.1 CONFLICT OF INTEREST HYPOTHESIS

We approach the research question of whether a conflict of interest has manifested in credit rating agency behavior by using the rating system refinement undertaken by Moody’s on April 26 1982, as this ensures that the bond rating changes are exclusively caused by Moody’s and not other factors, making it extremely suited for an examination of conflict of interest.

We propose counting variables of the number and total size of the bonds issued by firms 1, 2, and 5 years before and after the refinement as a proxy for the conflict of interest due to the positive relationship between these variables and rating fee revenues.

By analyzing the rating upgrades and non-downgrades, we find that there is evidence of a manifested conflict of interest.

Firstly, the probability of a bond rating upgrade is positively correlated with bond issuance activity one year before the refinement (1981), which may be interpreted to mean that the rating improvements were rewards for issuing bonds.

Secondly, a bond rating non-downgrade is correlated with an increase in the bond issuance activity for the year after the refinement (1983), which may denote that a non-downgrade in the refinement exercise may be motivated by the promise of a bond issue in the near future.

Two robustness checks are then implemented. The first robustness check controls for the possibility that the credit rating is related to both the pre and post refinement counting variables at the same time. We create pairs of pre and post counting variables and test these variables in a similar model, and find that the results continue to hold.

The second robustness check examines how the nominal bond rating, from which the rating change is calculated, is related to the regressors. In this case, we find that post refinement bond issuance activity has a negative impact on the bond rating.

Conversely, we find that pre refinement bond issuance activity has a positive impact, which may denote that the bond rating refinement was may have been used to reward clients, and that while there is evidence of a manifested conflict of interest before the refinement, there is little evidence of the same after the refinement.

7.2 LIMITATIONS OF STUDY

Currently, the study is limited by the amount and quality of data available. Stock and bond yield data for that time period are relatively limited, preventing their use, as this would cause the dataset to become even smaller. Therefore, this study is both possible and yet constrained by the usage of the rating refinement event. The need to use this event also prevents the updating of this study with regards to other time periods without additional considerations of the econometric problems that might ensue.

Additionally, there is a need to ascertain a practical working bond rating refinement model, especially with regards to industry level intricacies. While there are bond rating models in the literature, these models focus on new bond ratings rather than re-ratings. A stronger re-rating model will strengthen the results.

Similarly, the study could be improved by including industry level classifications, though this will have to be balanced against the data requirements.

7.3 FURTHER RESEARCH

While the results of this study are promising, there is still much work to be done. Stock and bond yield data should be obtained and analysed in tandem to provide further robustness checks of the validity of the conflict of interest variables.

Additionally, the conflict of interest variables should also be used in a non-static setting to check if these variables are robust over time.

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